

Name:

Solutions

Directions: For each rational function:

1. Identify an equation for each vertical asymptote (asymptotic discontinuity), if any exist.
2. Identify an equation for each horizontal asymptote, if any exist.
3. Identify the coordinates of any y-intercept or x-intercepts, if any exist.
4. Identify any value of x for which the graph has a hole (removable discontinuity)
5. Draw a neat and accurate graph of the function

1. $f(x) = \frac{1}{x}$

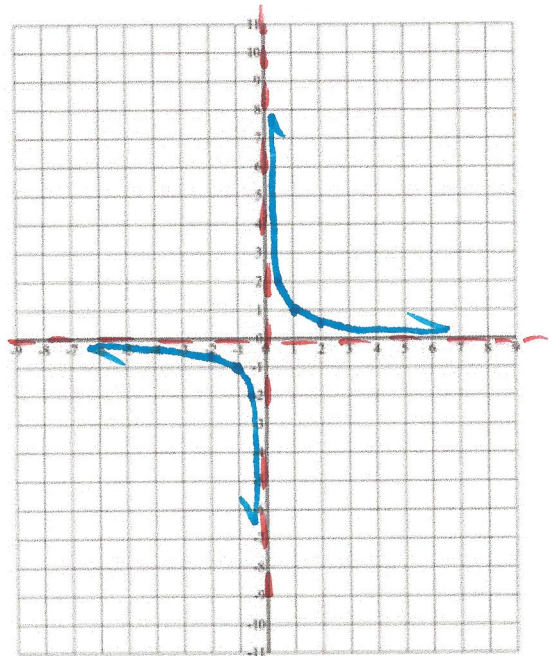
VA: $x=0$

HA: $y=0$

X-Intercept(s): *None*

Y-Intercept: *None*

X-Value of Hole: *None*



2. $f(x) = \frac{x}{x-3}$

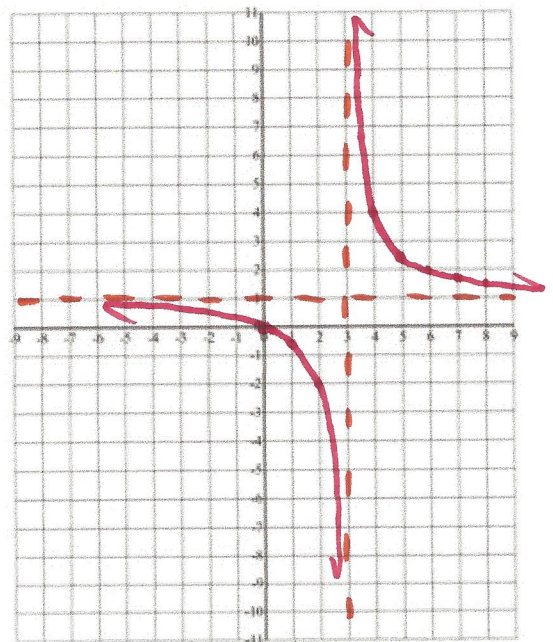
VA: $x=3$

HA: $y=1$

X-Intercept(s): $(0,0)$

Y-Intercept: $(0,0)$

X-Value of Hole: *None*



3. $f(x) = \frac{6}{x+2}$

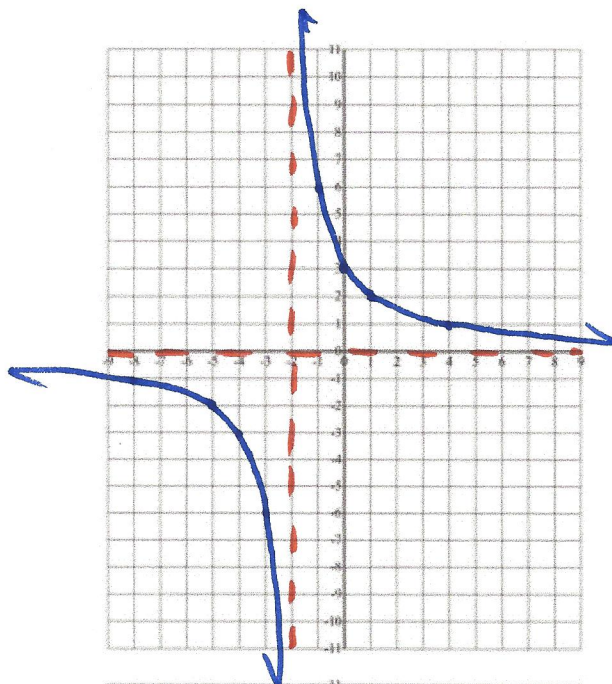
VA: $x = -2$

HA: $y = 0$

X-Intercept(s): *None*

Y-Intercept: $(0, 3)$

X-Value of Hole: *None*



4. $f(x) = \frac{x^2 - x - 6}{x + 2}$ or $f(x) = \frac{(x+2)(x-3)}{x+2}$

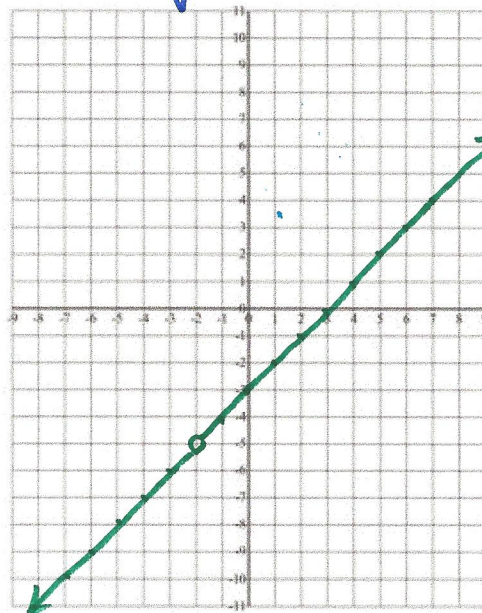
VA: *None*

HA: *None*

X-Intercept(s): $(3, 0)$

Y-Intercept: $(0, -3)$

X-Value of Hole: $x = -2$



5. $f(x) = \frac{x+2}{x^2 + x - 2}$ or $f(x) = \frac{x+2}{(x+2)(x-1)}$

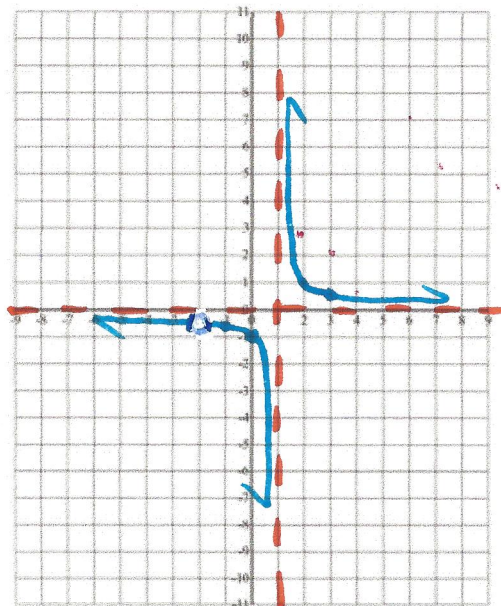
VA: $x = 1$

HA: $y = 0$

X-Intercept(s): *None*

Y-Intercept: $(0, -1)$

X-Value of Hole: $x = -2$



6. $f(x) = \frac{2}{x^2 + x - 2}$ or $f(x) = \frac{2}{(x+2)(x-1)}$

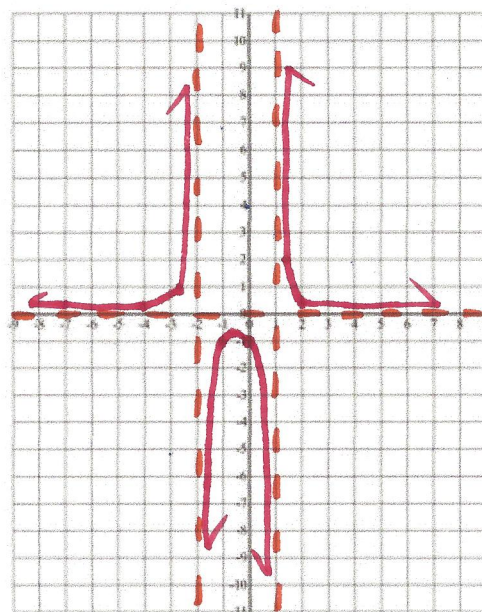
VA: $x = -2$ and $x = 1$

HA: $y = 0$

X-Intercept(s): none

Y-Intercept: $(0, -1)$

X-Value of Hole: None



7. $f(x) = \frac{x+4}{x^2 + x - 2}$ or $f(x) = \frac{x+4}{(x+2)(x-1)}$

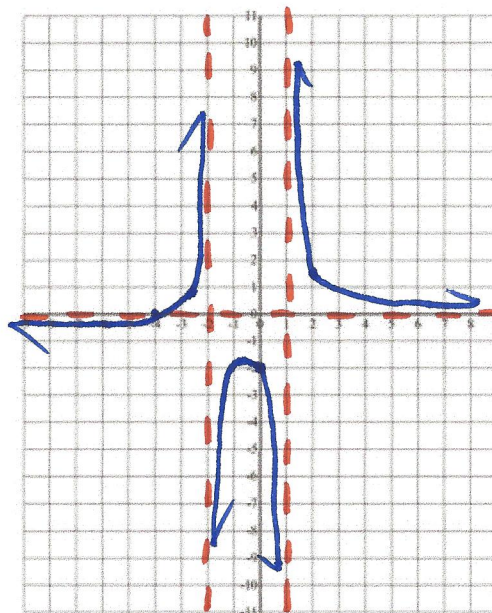
VA: $x = -2$ and $x = 1$

HA: $y = 0$

X-Intercept(s): $(-4, 0)$

Y-Intercept: $(0, -2)$

X-Value of Hole: None



8. $f(x) = \frac{x^2 + 4}{x^2 + x - 2}$ or $f(x) = \frac{x^2 + 4}{(x+2)(x-1)}$

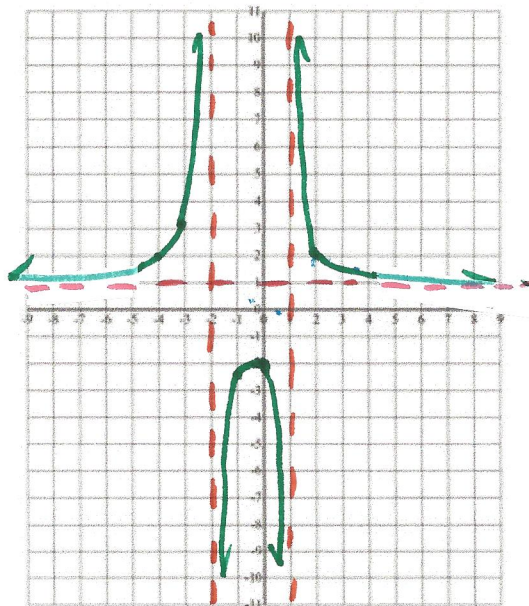
VA: $x = -2$ & $x = 1$

HA: $y = 1$

X-Intercept(s): none

Y-Intercept: $(0, -2)$

X-Value of Hole: None



9. $f(x) = \frac{x^2 - 4}{(x+2)(x-1)}$ or $f(x) = \frac{(x+2)(x-2)}{(x+2)(x-1)}$

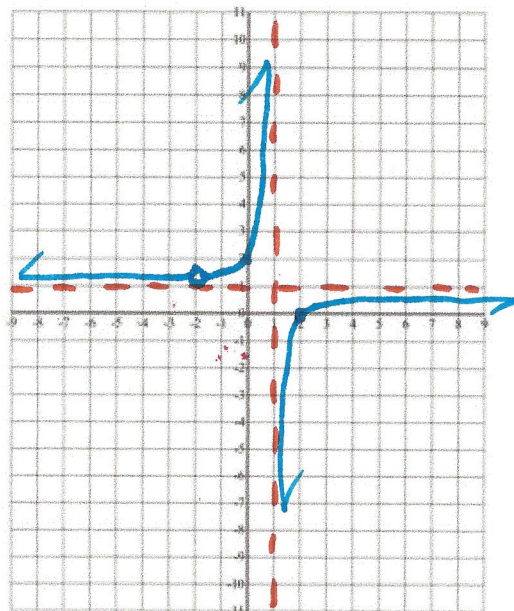
VA: $x = 1$

HA: $y = 1$

X-Intercept(s): $(2, 0)$

Y-Intercept: $(0, 2)$

X-Value of Hole: $x = -2$



10. $f(x) = \frac{2x^2 - 8}{x^2 + x - 2}$ or $f(x) = \frac{2(x-2)(x+2)}{(x+2)(x-1)}$

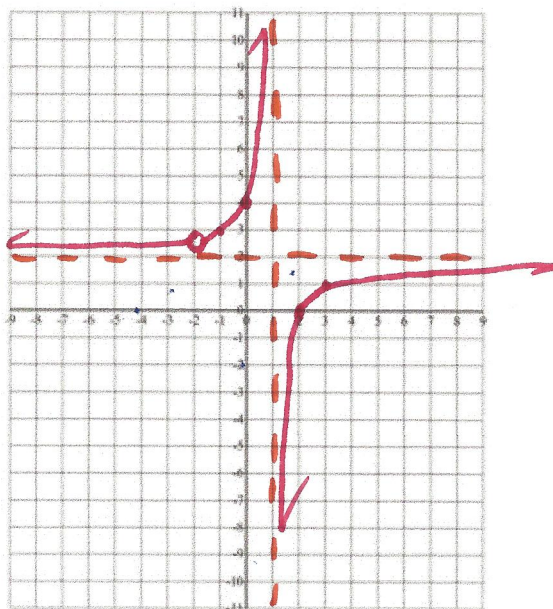
VA: $x = 1$

HA: $y = 2$

X-Intercept(s): $(2, 0)$

Y-Intercept: $(0, 4)$

X-Value of Hole: $x = -2$



11. $f(x) = \frac{18}{x^2 + 9}$

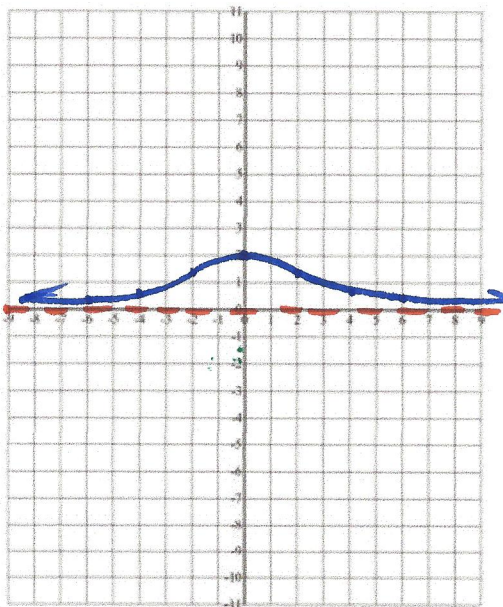
VA: None

HA: $y = 0$

X-Intercept(s): None

Y-Intercept: $(0, 2)$

X-Value of Hole: None



12. $f(x) = \frac{18x}{x^2 + 9}$

VA: *None*

HA: $y = 0$

X-Intercept(s): $(0, 0)$

Y-Intercept: $(0, 0)$

X-Value of Hole: *None*

